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# Communications Subsystem (CSS)

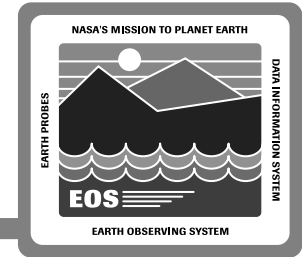
**Laks Prabhala**

**System Design Review - 29 June 1994**

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# CSS Roadmap

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**CSS Context**

**CSS Role**

**Technology Selection**

**CSS Decomposition**

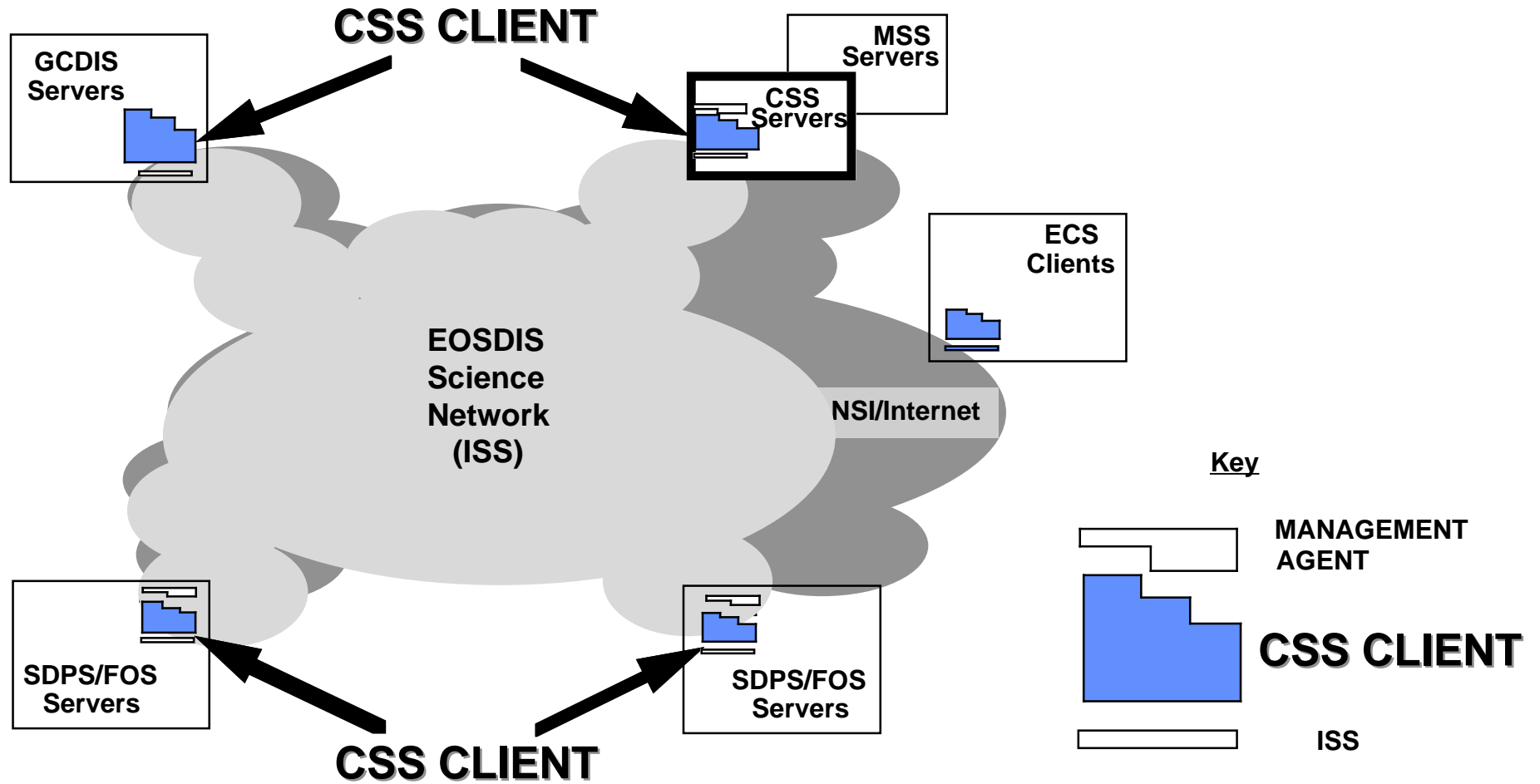
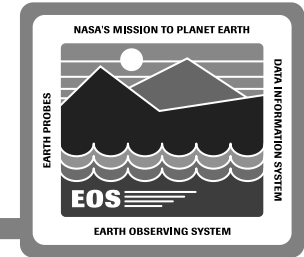
**Representative Object Service - Trader**

**Object Request Broker Features**

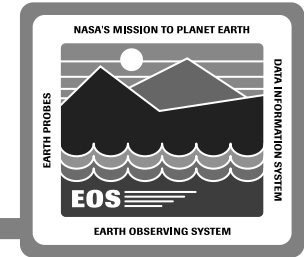
**CSS Migration Strategy**

**CSS Scalability & Evolvability**

# CSS Context

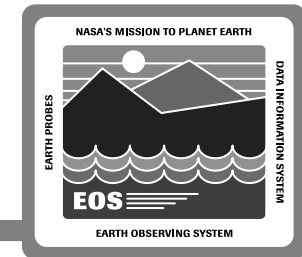


# CSS Role



<b>ECS Needs</b>	<b>CSS Capability</b>	<b>CSS Approach</b>
Transparent Find and Bind	Location, Access and other ODP transparencies.  Service Offerings Matching	Based on OMG - CORBA Specifications  Trader & Dynamic Invocation Interface (DII)
Transport Independent Protocols, Messaging and Data transfer	Transparent message/data transfer using Object Request Broker (ORB)	Object Request Broker (ORB) Specifications
Secured Access to approved services	Authentication, Authorization and Data Integrity Services	Kerberos and use of ACL's for Services (DCE)
Support to Legacy Services	File Access Services, Virtual Sessions, E-mail etc.	Encapsulation of Standard ftp, BBS, E-mail and Virtual Terminal; DFS

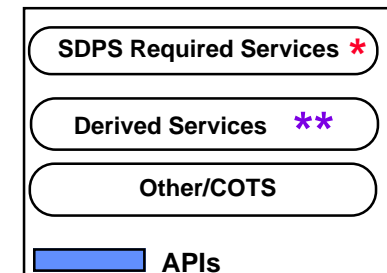
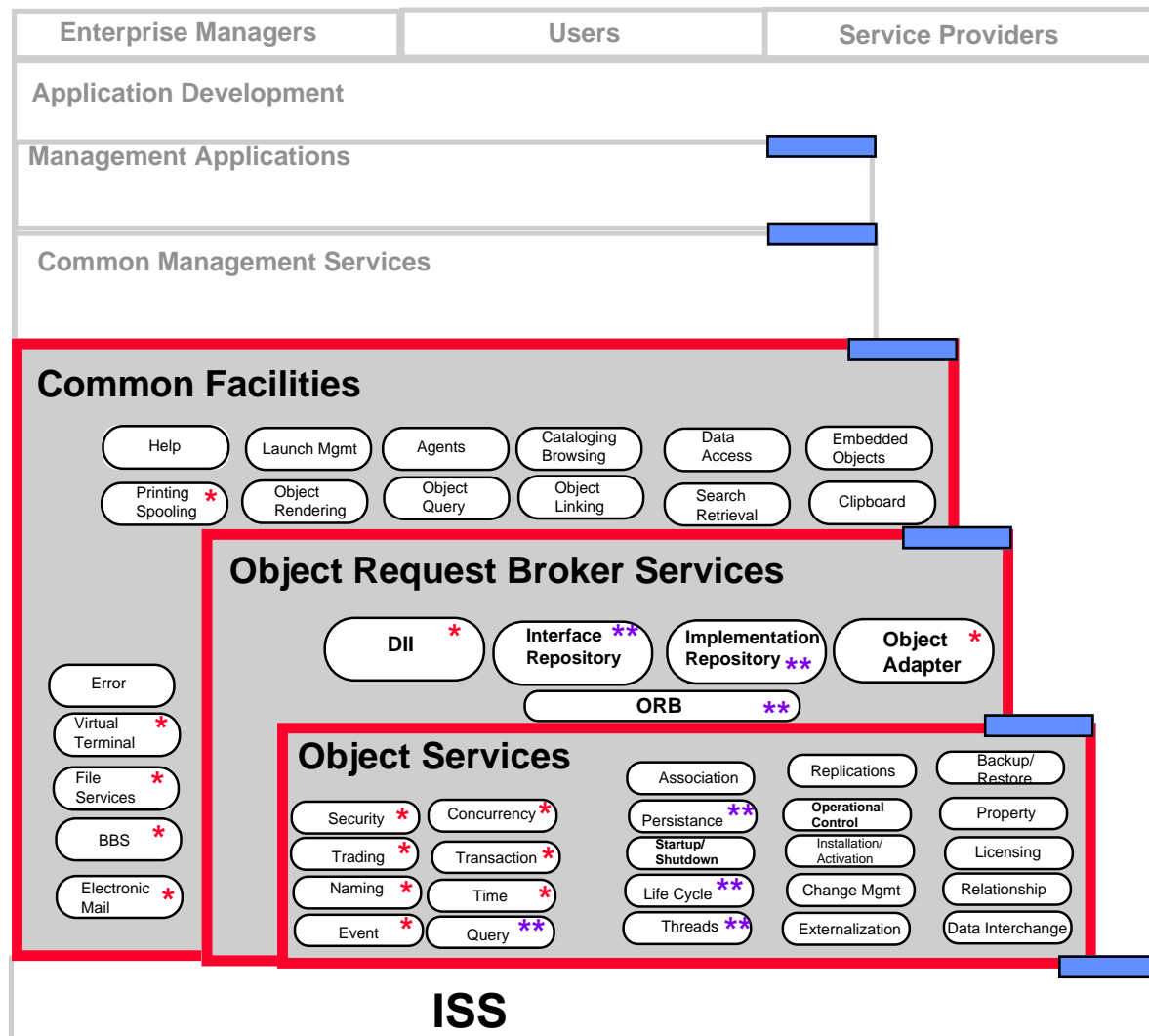
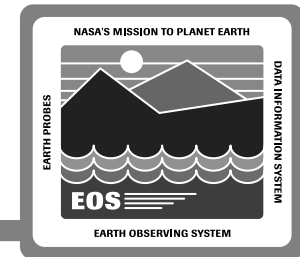
# Technology Selection



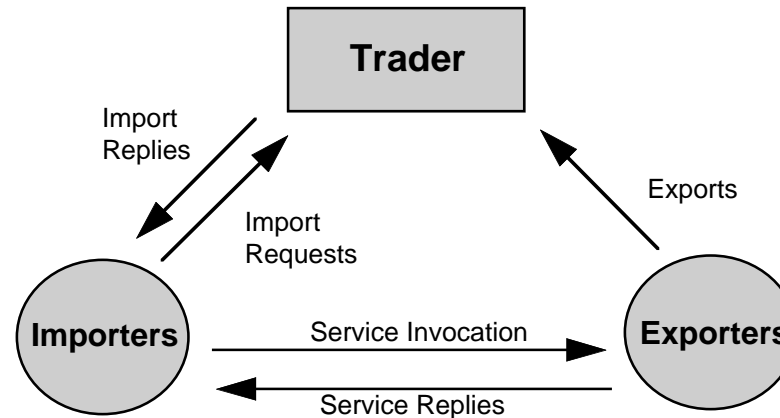
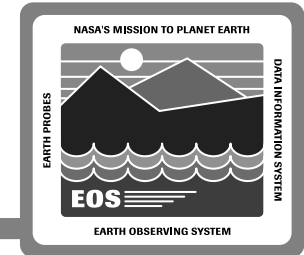
Technology Drivers	V0	DCE	S2K	NIIT EDS	DCE w/Ext.	OMG
Synch. Interprocessing	✓	✓	✓	✓	✓	✓
Asynch. Messaging	✓		✓	✓	✓	✓
Static Invocation	✓	✓	✓	✓	✓	✓
Explicit Static Binding	✓	✓	✓	✓	✓	✓
Implicit Static Binding	?	✓	✓	✓	✓	✓
Directory Service/Scalability	P	✓	?	✓		✓
Naming Service/Scalability	P	F	P	P	F	F
Security Service	P	✓	?	✓	✓	F
Object Technology	?	P	P	P	P	F
Time Synchronization	?	✓	?	✓	✓	F
Multivendor Interoperability		✓		✓	✓	F
O/S Transparency		✓		✓	✓	F
Event Processing/Maturity		P	?	P	P	F
Concurrency		✓		✓	✓	✓
Internationalized Security		F			F	F
Multiple Language Support		F	?		P	F
Legacy Server Integration				✓	✓	F
Dynamic Invocation			?	✓	P	✓
Dynamic Load Balancing			P		✓	F
Request Broker Service				P	✓	✓
Server Advertising/Scaling			P	P	P	F
Real Time Collaboration			✓	P	P	F
Trading						F
Federation Transparency						F

✓ = Compliance, P = Partial Compliance, F = Future Compliance, ? = Incomplete information

# CSS Decomposition

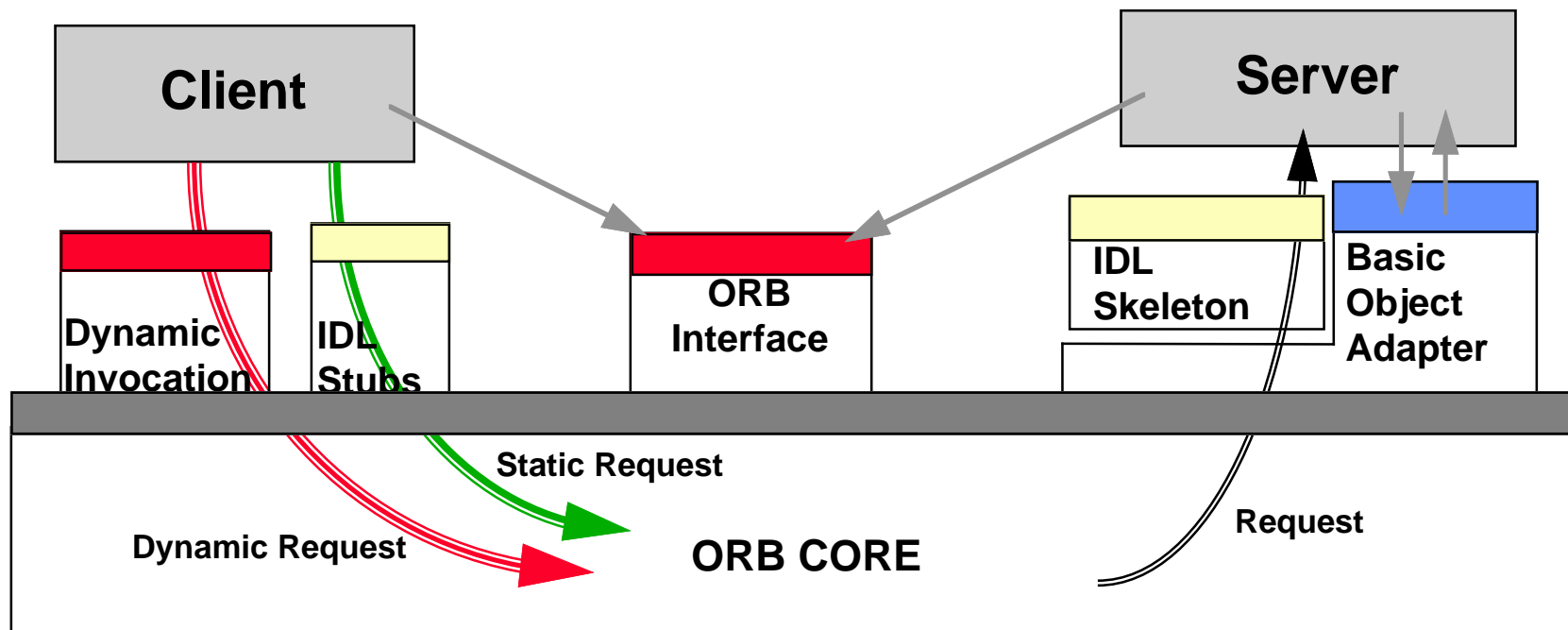
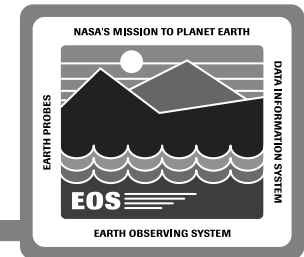


# Object Services: Trader



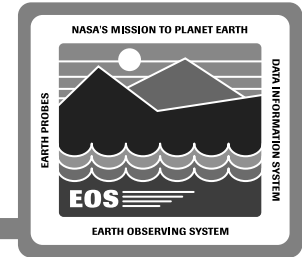
- **Key component to dynamic service invocation**
- **Includes policy for federation aspects of distributed services**
- **Performs service matching to client requests with constraints including quality of service and policy**
- **Interoperates with ECS service schema maintained by advertising service**

# Object Request Broker Features



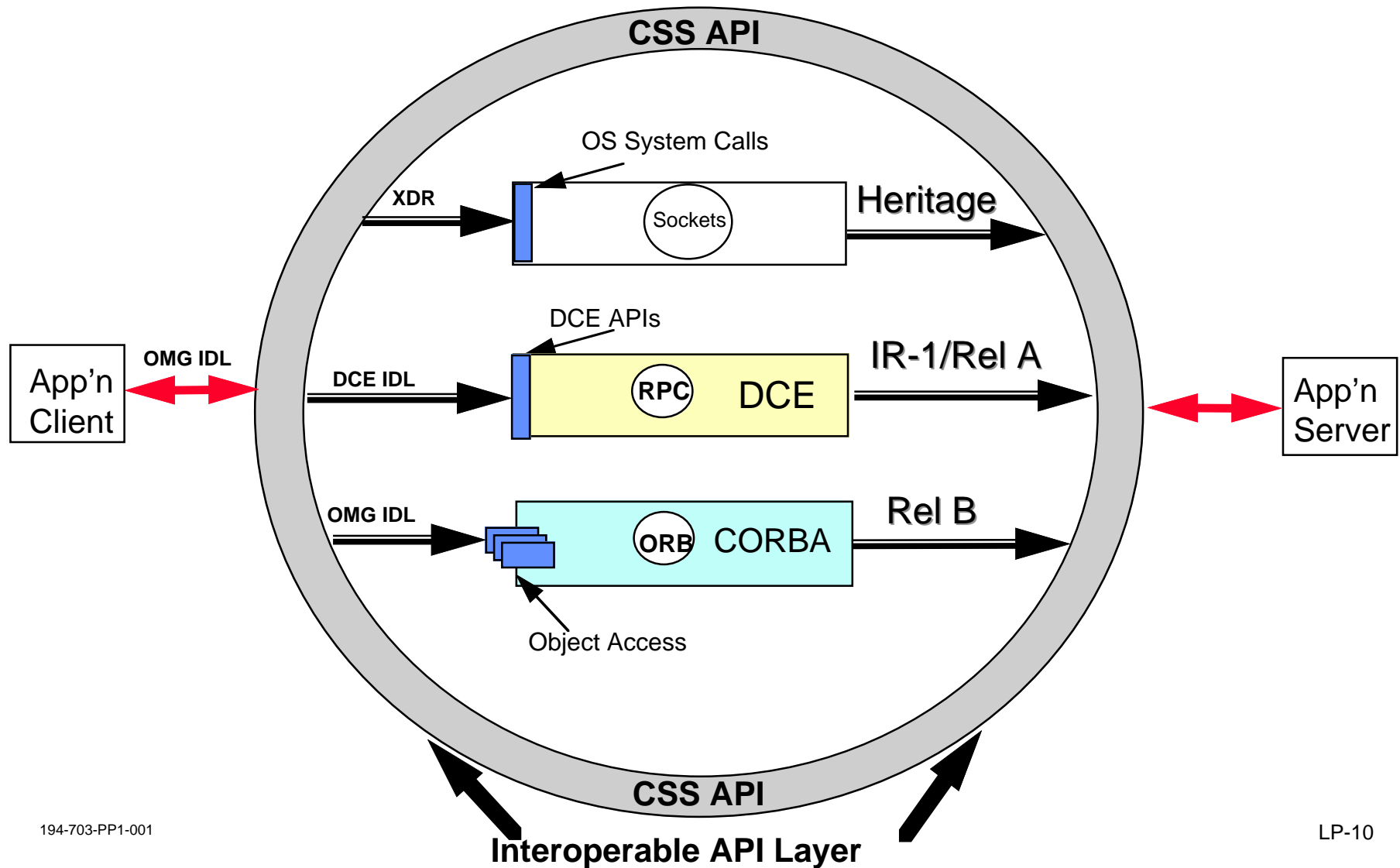
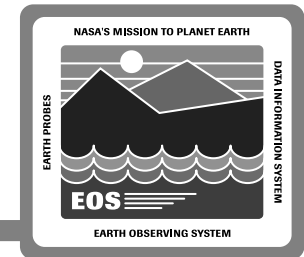


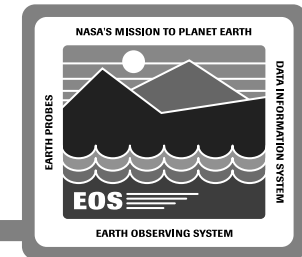
# Object Request Broker Features



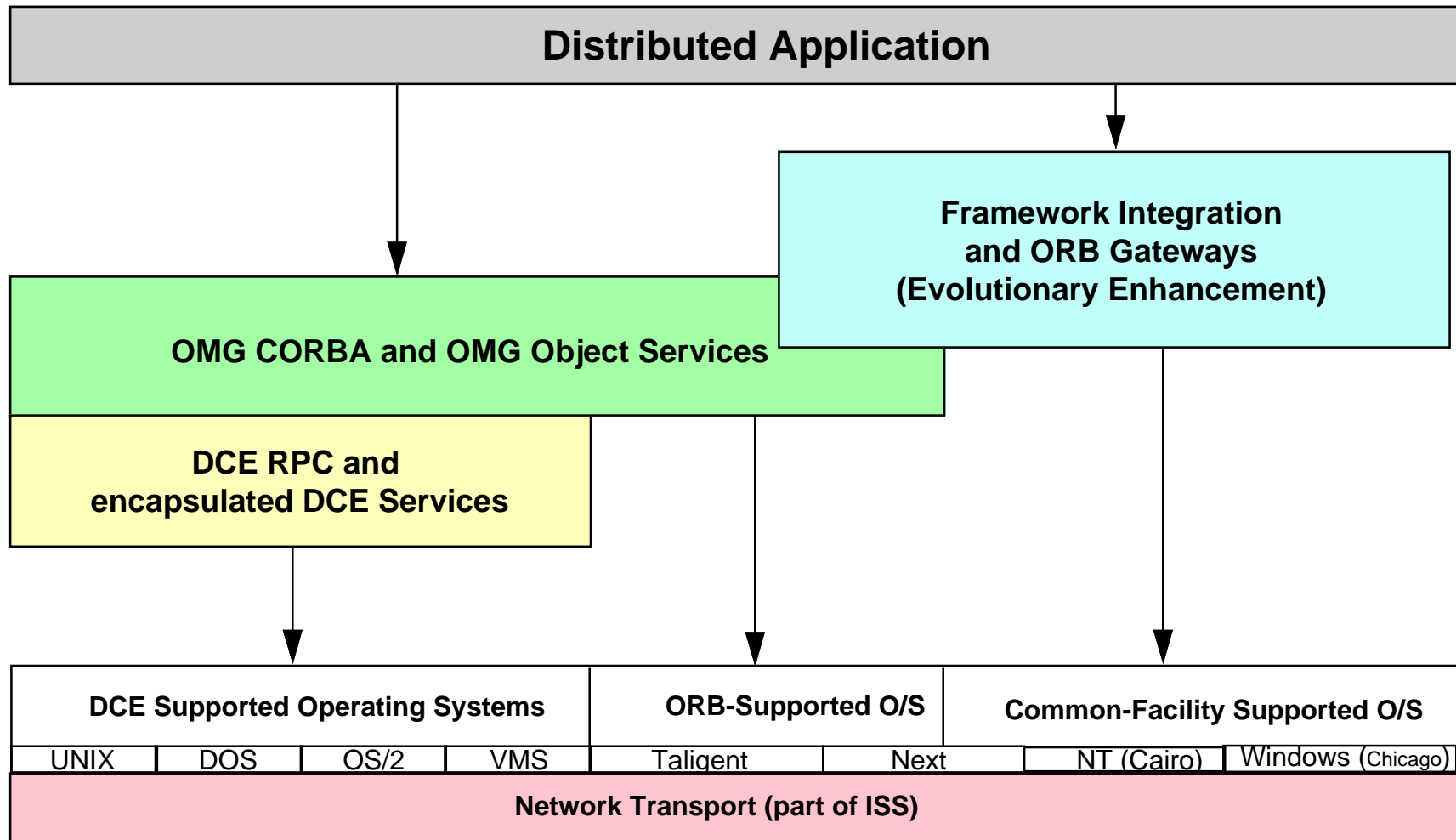
- **ORB Core**
  - **Language independence: Fortran, ADA, C, C++**
  - **Enables high degree of application interoperability**
  - **Alternative transports : sockets, DCE rpc, ONC rpc, Inter Process Communications (IPC) or shared memory environments**
- **Dynamic Invocation**
  - **Enables runtime creation of service access requests**
- **Object Adapter**
  - **Primary interface between server and Object Request Broker (ORB)**
  - **Part of pathway between client and server**
  - **Responsible for server registration and activation**
  - **Different types - Basic Object Adapter (BOA), Library Object Adapters and Object Oriented Database Adapters**

# CSS Migration Strategy

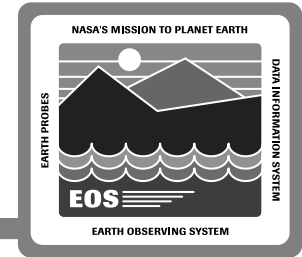




# Evolution to Other OS



# CSS Scalability & Evolvability



	<i>Design Approach</i>
<b><i>More Providers/Sites</i></b>	<ul style="list-style-type: none"> <li>• Dynamic Addition of Servers (Trader and Dynamic Invocation Interface)</li> </ul>
<b><i>Bigger Providers/Sites</i></b>	<ul style="list-style-type: none"> <li>• Replication of Servers</li> </ul>
<b><i>More Users</i></b>	<ul style="list-style-type: none"> <li>• Most users handled via Guest/General user Servers</li> <li>• Replication of Registry, Security and Privilege Services</li> </ul>
<b><i>Increased Automation</i></b>	<ul style="list-style-type: none"> <li>• Dynamic binding to new services</li> <li>• Caching and automatic update of data</li> </ul>
<b><i>New Service Support</i></b>	<ul style="list-style-type: none"> <li>• Evolvability to QoS negotiations by traders</li> <li>• Evolvability to Multimedia/Collaboration</li> </ul>